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2 Claims

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4 1. A communication system having network nodes (1, 2,  
5 3, 4, 5) of a control and/or drive network (11, 12), wherein  
6 for operating industrial machines, in particular printing  
7 machines, control and/or regulating signals are exchanged  
8 between the network nodes via a closed ringlike signal line  
9 (6, 7),

10  
11 in which one network node (2) exchanges signals with at  
12 least one further network node (1, 3) over a bidirectional  
13 signal path (10),

14  
15 in which at least one network node (2) has a switchover  
16 unit (8),

17  
18 in which the switchover unit (8) can be communicate  
19 with two further network nodes (1, 3) via two bidirectional  
20 signal paths (10),

21  
22 in which the switchover unit (8) in a first switching  
23 position connects the two signal paths (10) in the manner of  
24 a bidirectional conduction of the signals through the network  
25 node (2),

26  
27 in which the switching unit (8) in a second switching  
28 position interrupts the communication between the two signal  
29 paths and connects two signal courses (9) of at least one  
30 bidirectional signal path (10) to one another,

31  
32 characterized in that

33  
34 the communication system can be configured into various

1 networks (11, 12) via a suitable connection of the switchover  
2 units (8) of the network nodes (1, 2, 3, 4, 5); and

3  
4 that the networks (11, 12) have separate signal lines  
5 (6, 7) from one another.

6  
7 2. The communication system as recited in claim 1,  
8 characterized in that two network nodes (3, 4) of two  
9 networks (11, 12) are each mechanically connected to one  
10 another via two lines (9) which are embodied between the two  
11 network nodes (3, 4).

12  
13 3. The communication system as recited in one of claims  
14 1 or 2, characterized in that a network node (1, 2, 3, 4, 5)  
15 is connected to a control unit (23).

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17 4. The communication system as recited in one of claims  
18 1 through 3, characterized in that each network (11, 12) has  
19 one control unit with a master function and at least one  
20 control unit with a slave function.

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22 5. The communication system as recited in one of claims  
23 1 through 4, characterized in that the switchover unit (8) is  
24 switchable via a software controller.

25  
26 6. The communication system as recited in one of claims  
27 1 through 5, characterized in that one network (11, 12) is  
28 configured in accordance with a leading axis and the  
29 dependent following axes of a controller of a machine system;  
30 and that all the control units which execute control tasks as  
31 a function of the leading axis and all the control units that  
32 execute control tasks as a function of following axes of the  
33 leading axis are combined into one network (11, 12).

1           7. The communication system as recited in claim 6,  
2 characterized in that the machine system represents a  
3 printing machine (18) with a plurality of printing units  
4 (21).

5  
6           8. The communication system as recited in claim 7,  
7 characterized in that a control unit (1) is connected to a  
8 further ring line (14);

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10           that the further ring line (14) is connected to drive  
11 mechanisms (13) of a printing unit (21); and

12  
13           that the control unit (1) controls the drive mechanisms  
14 (13) chronologically synchronously.

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16           9. The communication system as recited in claim 7,  
17 characterized in that control units (1, 2, 3) of a plurality  
18 of printing machines (18, 20) are connected to one network  
19 (11, 12) and are supplied by the network with control  
20 signals;

21  
22           that a control unit performs a master function for the  
23 further control units, which perform slave functions.

24  
25           10. A method for controlling a communication system as  
26 recited in claim 1,

27  
28           characterized in that

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30           a change in the configuration of the networks (11, 12)  
31 is performed by means of software commands.

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33           11. The method as recited in claim 10, characterized in  
34 that if a malfunction occurs upon data exchange, a change in

the configuration of the network is performed in order to  
exclude defective signal communication and/or a defective  
network node or a control unit from one network (11, 12).

12. The method as recited in one of claims 10 or 11,  
characterized in that the configuration of the network is  
performed as a function of a configuration of a plurality of  
machines of a processing group, in particular a printing  
machine (18).

13. The method as recited in claim 12, characterized in  
that if a malfunction occurs in a machine of the production  
group, the network node which supplies the defective machine  
with control signals is excluded from the network (11, 12).